Singapore Actuarial Society
SAS GN G01
Guidance Note for
Actuaries Investigating Policy Liabilities
Relating to General Insurance Business
Adopted on
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1 BACKGROUND AND SCOPE

1.1 This Guidance Note applies to members of the Singapore Actuarial Society (SAS) performing a statutory valuation of policy liabilities relating to general insurance business in Singapore. For valuations conducted for other purposes, members may choose to follow this Guidance Note as a matter of good practice.

1.2 A member of SAS in a jurisdiction other than Singapore does not have to comply with this Guidance Note if the local actuarial standards in that jurisdiction govern the valuation of policy liabilities.

1.3 The purpose of this Guidance Note is to provide members with principles and directions that must be followed with regard to technical aspects of the work described in Section 1.1.

1.4 Members of the Singapore Actuarial Society who perform statutory valuations of policy liabilities should make reference to their compliance with this Guidance Note whenever they give written advice. Members should highlight any area where the member gives advice which is not consistent with this Guidance Note. In this case, the member should ensure that adequate records are kept to justify any departure from this Guidance Note.

1.5 This Guidance Note must be considered in the context of applicable legislation. If there is a conflict between this Guidance Note and any applicable legislation, then the legislation takes precedence, and any differences must be documented in the actuarial valuation report. In this context, legislation includes regulations, prudential standards, subordinate standards, accounting standards, rules issued by government authorities, and standards issued by professional bodies which have the force of law.

1.6 The essence of a profession lies in upholding its standards and ethics in the public interest. If a member of the SAS believes that the Guidance Note is ambiguous or for some other reason wishes to seek clarification of it, that member may consult the SAS for guidance as to the interpretation of the Guidance Note.

2 DEFINITIONS

‘**Act**’ means the Insurance Act (Cap 142) of the Republic of Singapore.

‘**Central Estimate**’ is equivalent to ‘Best Estimate’, is intended to be an unbiased estimate of the mean (statistical expectation) of the CL or the URR.

‘**Case Estimates**’ are the claim-by-claim estimates, set and recorded by a general insurer at a particular date, of the amounts which are required to settle the reported and open general insurance claims.

‘**Claim Liabilities (CL)**’ relates to the value of future Claim Payments in relation to all claims incurred prior to and on the valuation date (other than payments which have fallen due for payment on or before the valuation date), whether or not they have been reported to the general insurer, and includes any expense expected to be incurred in settling these claims.

‘**Claim Payments**’ are the amounts a general insurer has paid, or is liable to pay in the future, in respect of its exposure to general insurance claims, comprising payments made directly to claimants and Direct Expenses.

‘**Class of Business**’ means a grouping of general insurance claims valued as a unit, which may be a regulator-defined class of business.

‘**Direct Expense**’ means allocated third party costs. These include payments on behalf of claimants, medical and legal fees where these are allocated to particular general insurance claims.

‘**General Insurance Business**” means insurance business other than life business as defined in the Act

‘**General Insurer**’ means a company registered as an insurer and licensed to carry on general insurance business.

‘**Incurred But Not Reported (IBNR)**’ refers to general insurance claims that arise from events which have already occurred, but which have not yet been reported to the general insurer as at the valuation date. In this Guidance Note reference to IBNR also includes ‘**Incurred But Not Enough Reported (IBNER)**’ which represents the estimated difference between the amount ultimately required to settle the general insurance claims which have been reported to the insurer at the valuation date, and the Case Estimates at the valuation date.

‘**Indirect Expense**’ means the management and administrative expenses incurred by the general insurer in relation to the payment of the CL and the URR. Indirect Expenses exclude Direct Expenses and are not allocated to claims, being usually estimated on an aggregate basis across the general insurer or Class of Business.

‘**Material**’ means important or essential in the opinion of the actuary. For this purpose, ‘Material’ does not have the same meaning as in accounting standards. ‘Materiality’ has a consistent meaning to ‘Material’.

‘**Premium Adjustment**’ means an increase or a decrease of the premium made after the insurance policy start date (including premium refunds from policy cancellations) on insurance business in force at the valuation date.

‘**Previous Valuation**’ means the previous valuation (if any) undertaken at the most recent annual balance date of the company. (Interim valuations are not defined here as Previous Valuations, but can be used for additional comparison.)

‘**Reinsurance Cost**’ means the cost or premium to the general insurer of purchasing reinsurance cover in respect of the general insurance claims being valued.

‘**Reinsurance Recovery**’ means an amount recoverable, in respect of a general insurer Claim Payments, from reinsurance agreements.

‘**Unclosed Premium**’ refers to the premium revenue from insurance policies that have not yet been processed, but for which the general insurer is liable at the valuation date.

‘**Unexpired Risk Reserve (URR)**’ relates to the value of future Claim Payments arising from future events insured under policies in force as at the valuation date and includes any expense expected to be incurred in administering the policies and settling the relevant claims. That value is unknown at the date of the valuation and is treated as a random variable. Such events would not have been reported as at the valuation date.

3 MATERIALITY

3.1 The actuary must take materiality into account when performing any task or forming any opinion or judgment, or reaching any conclusion, required under, or necessitated by, this Guidance Note.

3.2 Whether something is material or not will always be a matter requiring the exercise of the actuary's professional judgment. When determining the threshold of materiality, the actuary assesses materiality from the point of view of the intended user(s), recognising the purpose of the actuarial valuation; thus, an omission, understatement, or overstatement is material if the actuary expects it to affect significantly either the intended user's decision-making or the intended user's reasonable expectations.

3.3 While it is reasonable to omit individual items on the grounds of materiality, thought should be given to the cumulative impact of such omissions. Individual items should not be omitted if the overall result would be materially affected by the omissions.

4 DATA & INFORMATION

4.1 Basis of Data

4.1.1 It is the actuary's responsibility to ensure that the data used provides an appropriate basis for estimating insurance liabilities. This includes the insurer's own exposure and claim experience data, but should also extend to industry data where the insurer's own data is not sufficient to reduce uncertainty to an acceptable level. Where even industry data is sparse, it may be necessary to rely, to a greater or lesser extent, on professional judgement. In such cases, the actuary should explain the reasoning for his choices.

4.2 Data Source and Verification

4.2.1 The actuary should take reasonable steps to verify consistency, completeness and accuracy of the information provided by the company (for example, by undertaking reconciliation against the company's financial statements, trial balances and/or other relevant records, if these are available).

4.2.2 The actuary should consider:

a) the administration and accounting procedures for policies and claims;
b) the characteristics of insurance policies, underwriting and claim processes; and the relevant economic, legal and social environments and trends

4.2.3 The actuary should consider and document:

a) data controls, including reconciliations undertaken or relied upon;
b) discrepancies that cannot be resolved with the company, together with any consequent limitations;
c) any comments the actuary has on the data used, data extraction, data summary, quality checks and auditing at source; and
d) any consequent limitations arising from any reliance placed on others in accordance with section 4.4 of this Guidance Note

4.2.4 If the actuary is unable to obtain timely access to some or all of the required information from other persons (including the company); or such information as is provided is limited, then the actuary may omit, from the actuarial valuation report, analysis that depends on that information. However, the actuary must provide details in the report regarding the circumstances as to why that analysis has been omitted and explain any consequent limitations.

4.2.5 If the actuary believes that the information provided by the company is insufficient for the purpose of the assignment, then the actuary should decline to undertake the assignment.

4.3 Sub-division or Grouping of Risks

4.3.1 The valuation of the insurance policy liabilities of the insurer may require the sub-division or grouping of risks into lines or divisions of lines of business with similar characteristics.

4.3.2 The actuary should determine the most appropriate subdivision or grouping for the purpose of the valuation. However, the value of the insurance policy liabilities should be reported for each line of business prescribed under the relevant regulation.

4.3.3 Notwithstanding this, where subdivision or grouping of lines of business is made, the actuary should include a statement as to the manner of subdivision or grouping of risks into lines and divisions of lines of business.

4.4 Reliance on others

4.4.1 If, in performing work under this Guidance Note, the actuary wishes to rely on someone else's work (eg, another actuary's valuation, catastrophe losses estimates from claims assessor, etc.), then the actuary must:

a) inform the other person that the actuary is relying on their work; and
b) assess the appropriateness of the other person's work for that purpose

4.4.2 If, following the actuary's assessment under clause 4.4.1(b), the actuary determines that it is not appropriate to rely on the other person's work, the actuary should provide their own alternative, or supplementary analysis and should document that analysis.

4.4.3 In any report prepared under this Guidance Note, the actuary must:

a) state what the actuary has relied on from another person; and
b) describe details of the steps the actuary took to determine whether it was appropriate to rely on the other person's work

5 ACTUAL VERSUS EXPECTED EXPERIENCE

5.1 As part of the assumptions selection process, the actuary should provide and document a comparison by class of business of the actual experience to the expected experience implied by the valuation basis of the Previous Valuation. The Previous Valuation should normally be the last statutory valuation but otherwise refers to the last valuation where there is a detailed review of valuation assumptions undertaken by the actuary.

5.2 In light of the valuation basis, the actuary should decide which aspects of the actual experience relative to the expected experience are relevant for this analysis.

5.3 The actual versus expected analysis should cover both Claims Liabilities ("CL") and Unexpired Risk Reserve ("URR") aspect of the insurance liabilities, although the analysis does not need to be conducted separately for the two elements.

5.4 The evolvement in projected ultimate claims cost in successive valuations should also be reviewed and commented upon.

5.5 The actuary should document the known and assumed reasons for deviation from the expected experience.

6 VALUATION METHODS

6.1 Selection of valuation methods

6.1.1 The valuation methods the actuary uses to determine the Central Estimate of the Claim Liabilities ("CL") and/or the Unexpired Risk Reserve ("URR"), applied separately by Class of Business, should be methods that incorporate actuarial principles which, in the actuary's judgment, are reasonable in the circumstances.

6.1.2 The valuation methods and the Class of Business subdivisions or groups selected will depend on:

a) the purpose of the valuation;
b) the available information;
c) the nature and homogeneity of the data;
d) whether analysis is by accident period or underwriting period;
e) the type of business being valued;
f) the maturity of the business;
g) the results of the analysis of experience;
h) the company's environment;
i) relevant industry practice;
j) the particular circumstances of the company; and/ or
k) any other matters identified by the actuary as having a material impact on the valuation result

6.1.3 When selecting valuation methods, the actuary should consider whether to analyse the following aspects of claim experience (by Class of Business):

a) claim frequency;
b) average claim size;
c) pattern of claim occurrence (or seasonality);
d) development of reporting of claims;
e) development of claim settlement or finalisation;
f) development of Claim Payments;
g) development of Case Estimates;
h) incidence and development of large claims;
i) potential impact of catastrophes; and
j) any other aspect of claim experience that will have a material impact on the valuation result

6.1.4 The actuary should document the reasons for the chosen valuation approach. If the data or other factors limit the actuary's choice of valuation methods, then the actuary should document this limitation together with any consequent limitations.

6.2 Employment of valuation methods

6.2.1 The actuary should document a description of the valuation methods used, including:

a) how any 'roll forward' process is carried out;
b) the reasons (and an explanation of the rationale) for selecting the valuation methods employed;
c) any control processes undertaken when checking that the application of the valuation methods occurs as intended;
d) the criteria used for selecting between the valuation methods, or for weighting or blending the valuation methods (if more than one valuation method is used) with the rationale explained; and

e) the rationale for any change to the valuation methods adopted since the previous valuation, by Class of Business or grouping

6.3 Estimates appropriate to the valuation date

6.3.1 The actuary should:

a) produce valuation results appropriate to the valuation date; and
b) allow for material changes up to the valuation date, if the valuation is carried out using a roll forward process based on information and claim data current at a date that is before the valuation date

6.3.2 If, before finalising the actuarial valuation report, the actuary becomes aware of events after the valuation date which (based on reasonable grounds) are expected to have a material impact on the valuation results, then the actuary should:

a) disclose in the actuarial valuation report that such events have occurred and comment on the possible effect on the valuation results in the actuarial valuation report; and
b) if time reasonably permits, consider allowing for such events in the valuation, taking into account the nature of the event and other relevant matters, such as the regulations and/or accounting standards relevant to the valuation

6.4 Provisions for Adverse Development (PADs)

6.4.1 The actuary should establish a transparent and robust framework for establishing PADs.

6.4.2 When PADs are based on internal analysis, then details of this analysis including approach and assumptions should be provided. If PADs are based on external work, then the source of that work should be disclosed.

6.4.3 In estimating PADs by class of business the actuary may, if deemed appropriate, have regard to published industry research or other suitable external benchmarks.

6.4.4 If external works, such as published industry research and benchmark studies, are used as a basis for estimates of PADs, the actuary must consider if any adjustments are needed given the nature of the company's insurance portfolios. The actuary should clearly document in the actuarial valuation report why the actuary has deemed that modifications to results of external work are or are not necessary, along with the basis of any modifications.

6.4.5 When advising on PADs, the actuary should have regard to their reasonableness and consistency over time, between classes of business, between claims liabilities and URR.

7 VALUATION ASSUMPTIONS

7.1 Selection of assumptions

7.1.1 In setting the valuation assumptions to determine the Central Estimate of CL and/or the URR, the actuary should:

a) consider the relevant experience of the company or, if the relevant experience of the company is not sufficiently credible, then consider the available relevant industry statistics or other information;
b) consider the valuation methods used and the analysis of the company's relevant actual historical claims experience;
c) take into account any special features of, or trends in, the claims experience
d) consider the consistency of the valuation basis as a whole, including: consistency between the Central Estimate of CL and the Central Estimate of any URR allowing for changes in underwriting, pricing or similar issues, as well as consistency with the results of the actual versus expected analysis undertaken in Section 4

7.1.2 The actuary should be aware of factors both internal and external to the company that may have influenced the observed patterns in historical experience and/or future patterns of claims. Such factors, and changes to them, may include, but are not limited to:

a) underwriting strategies;
b) mix of business;
c) policy coverage, including deductibles, limits and exclusions;
d) legislation;
e) economic, technological, medical, court awards and social trends;
f) claim management procedures; and
g) reinsurance programme

7.1.3 The actuary should document, by class of business, the assumptions adopted with the rationale explained, including the extent to which the assumptions used are based on the historical experience of the company. If the assumptions for a class of business or grouping have changed from the previous valuation, then reasons for the change should be explained and documented.

7.2 Economic assumptions

7.2.1 The actuary should allow for any future escalation of claim payments (often called "claim inflation"). Whether the allowance is explicit or implicit will depend on the valuation methods being used. Conceptually, the escalation assumptions should consider:

a) Wage and/or price inflation; and
b) Superimposed inflation (any residual claim inflation arising for reasons other than wage and/or price inflation)

7.2.2 Legislative and/or regulatory requirements may prescribe whether claim payments are to be discounted. The actuary should consider the purpose of the valuation and document whether the future claim payments are to be discounted. Discount rates used should be based on the redemption yield, as at the valuation date, of a portfolio of government bonds or securities with similar features, with currency and duration similar to that of the insurance liabilities for that particular class of business, where reasonably practicable.

7.2.3 If the projected payment profile of the future claim payments cannot be replicated (for example, for classes of business with extended runoff periods), then discount rates consistent with the intention of clause 7.2.2 should be used.

7.3 Indirect Expense assumptions

7.3.1 Accounting, legislative and/or regulatory requirements prescribe whether an allowance needs to be made for Indirect Expenses. In that light, the actuary should consider the terms of reference and the purpose of the valuation and document whether to make an allowance for relevant Indirect Expenses.

7.3.2 For the CL, the relevant Indirect Expenses include future on-going claim management and administration expenses for all incurred claims (including both reported and IBNR claims).

7.3.3 For the URR, the relevant Indirect Expenses include:

a) policy management and administration expenses to allow for the cost of managing unexpired policies for which the company is at risk; and
b) claims management and administration expenses for claims establishment and runoff

7.3.4 The actuary may use one of the following to estimate future Indirect Expenses:

a) the company's historical Indirect Expense information that is reasonably allocated; and/or
b) the company's internal information that is available to notionally allocate expenses

7.3.5 If such information is unavailable or is unreliable, the actuary should consider any available external benchmarks to assist in setting an appropriate assumption for the Indirect Expenses, and ensure that the overall expense assumptions adopted for the company are reasonable.

7.4 Non-Reinsurance Recovery assumptions

7.4.1 The actuary should consider and document whether to make an allowance for any relevant future Non-Reinsurance Recovery such as salvage and subrogation.

7.4.2 In evaluating any future Non-Reinsurance Recovery, the actuary should consider:

a) the Non-Reinsurance Recovery Case Estimates (if available);
b) analysis of the company's past Non-Reinsurance Recovery experience (if available); and
c) how it relates to the assumptions about the future development of policy liabilities

7.5 Reinsurance Recovery and Reinsurance Cost assumptions

7.5.1 The actuary should consider whether to make an allowance for any relevant future Reinsurance Recoveries and document the results of that consideration.

7.5.2 In evaluating any future Reinsurance Recovery, the actuary should consider:

a) the reinsurance program structure, the Reinsurance Recovery Case Estimates (if available);
b) the past Reinsurance Recovery experience (if available) of the company;
c) how these relate to the assumptions about the future that are being made;

d) whether the evaluation of Reinsurance Recoveries is consistent with the evaluation of the gross claim amounts/ patterns to which they relate; and
e) whether to allow for the associated credit risk or whether reinsurance contracts may not be enforceable or may be disputed, as well as the potential distributions from liquidation of past reinsurers

7.5.3 If the valuation is conducted based on data net of reinsurance recoveries, consideration should also be given to the possibility of reinsurance exhaustion and the adverse follow-on impact on net results.

7.6 Premium Adjustment and Unclosed Premium assumptions

If the URR is being estimated, then the actuary should consider (if relevant):

a) unexpired contractual obligations arising from the insurance business with an inception date up to the valuation date, for which the company is liable as at the valuation date;
b) any projected Premium Adjustments and make reasonable allowance for the effect of the anticipated Premium Adjustments; and
c) the company's Unclosed Premiums and other commitments arising from its insurance policies, and make reasonable allowance

7.7 Provision for Adverse Deviation assumptions

7.7.1 If the scope of the valuation includes the estimation of a Provision for Adverse Deviation ("PAD"), then the actuary must provide a quantitative indication of the variability. This can be achieved by examining scenario analyses, sensitivity analyses and/or statistics such as the estimated standard deviation of any assumed probability distribution of claim cost outcomes.

7.7.2 If a PAD is required for the company, or for multiple Classes of Business, then the estimation process should be reasonable in aggregate and the actuary must consider and document any diversification benefit applied.

7.7.3 If a PAD is required for a Class of Business in isolation, then the relevant undiversified PAD should be evaluated and documented.

8 UNCERTAINTY

8.1 Uncertainty

8.1.1 The actuary should consider the level and the implications of uncertainty related to the assessment of possible future claims amounts.

8.1.2 The actuary should describe, qualitatively, the main sources of uncertainty in the valuation and communicate the consequence of that uncertainty in the actuarial valuation report.

8.1.3 Where reasonably practicable and appropriate, the actuary should quantitatively describe significant sources of uncertainty, using tools such as sensitivity analysis, scenario analysis or descriptive statistics.

8.1.4 The actuary should highlight and document the key risks and uncertainty identified during the valuation, along with implications of the uncertainty.

8.1.5 The actuary should consider and document the implications of the uncertainty identified in key assumptions of the valuation. Sensitivity and/or scenario analysis on key assumptions should be undertaken as a means of quantitatively illustrating the impact of the uncertainty related to the key assumptions.

8.1.6 The assumptions used in these analyses should be selected to illustrate the impact on results when a reasonable variation to key assumptions is made. The actuary should document the results of the sensitivity analyses and comment in the actuarial valuation report on the reasonableness of the alternative assumptions. The actuary should state that the variations selected in the sensitivity analyses do not indicate upper or lower bounds of all possible outcomes.

9. RESULTS AND RECONCILIATION WITH PREVIOUS VALUATION

9.1 Valuation Results

9.1.1 The actuary should disclose a clear summary of each of the following elements (as relevant) by lines of business in the actuarial valuation report:

a) The Central Estimate of claims liabilities – split by case estimates, IBNR and any allowance for indirect expenses
b) The Central Estimate of unexpired risk reserves
c) The provision for adverse deviation – including any allowance for diversification
d) Sum of relevant items

9.1.2 The actuary should document the control process around the valuation results, including any high-level reasonableness tests undertaken during the valuation.

9.2 Reconciliation between Current and Previous Valuation

9.2.1 The actuary should quantify the amount by which the Central Estimate of Claim Liabilities determined at the previous valuation has proven too great or too small to provide for claim developments in the inter-valuation period and the residual Claim Liabilities estimate. For this purpose:

a) the Claim Liabilities estimate may be net of any allowance for indirect expenses;
b) the developments in the inter-valuation period are those relating to exposure for which the estimates at the previous valuation date aimed to provide; and
c) the residual Claim Liabilities estimate is that portion of the current valuation's Claim Liabilities estimate that relates to prior exposures as at the previous valuation

9.2.2 For any class of business being assessed, the actuary may substitute the sum of the estimates for the Claim Liabilities and the Unexpired Risk Reserve for the Claim Liabilities estimate to perform clause 9.2.1.

9.2.3 The actuary should also perform a review of the reasonableness of the Unexpired Risk Reserve determined at the previous valuation, based on current knowledge, with reference to the key assumptions used in deriving that Unexpired Risk Reserve and the subsequent experience.

9.3 Attribution

9.3.1 The actuary should explain the amount determined in clause 9.2.1 by quantifying the contribution of the elements. For illustration:

a) change in explicit economic assumptions such as discount rate and expected future inflation, between the current and previous valuation;
b) experience during the inter-valuation period being different to that projected at the previous valuation. "Experience" here excludes changes in valuation model and assumptions; and
c) any residual changes

10 REPORTING

10.1 Format

10.1.1 If the investigation of the policy liability is carried out for statutory purpose, then the format of the actuarial valuation report should follow the headings prescribed by the relevant regulations if any. The format of the report may deviate from the prescribed format only if this can improve the flow of the report. In so doing, the report should signpost the prescribed requirement, and should point the reader to where these deviations appear in the report.

10.2 Content

10.2.1 The actuarial valuation report should include definition of terms and expressions used in the report that may be ambiguous or subject to wide interpretation. The actuary should disclose the extent of compliance with the requirements specified by MAS and reasons for not complying fully with the requirements.

10.2.2 The actuary should ensure the valuation report provides sufficient information in order that a reader of that report could draw a conclusion that the derivation of the results stated in the report was reasonable. The valuation report should not however include information that is not material and so obscure material information.

10.2.3 The actuary should prepare, date and sign a written actuarial valuation report. The report should deal with:

a) who has commissioned the report and, if different, the addressee(s) of the report;
b) the name of the actuary and the capacity in which the actuary is acting;
c) purposes of valuation and terms of reference
d) any potential conflict of interest and how this has been resolved;
e) the extent, if any, to which the report falls short of, or goes beyond, its stated purpose;
f) the extent of compliance with regulatory requirements and any professional standards and the reasons for not complying fully with this standard;
g) any restrictions placed upon the actuary in performing the valuation;
h) information and data;
i) valuation approach and methodology;
j) valuation assumptions, including actual versus expected experience analysis, where applicable;
k) the results of the valuation, including a reconciliation of the results with the most recent relevant valuation, where applicable;
l) uncertainty; and
m) any other issues the actuary identifies as a material matter relevant to the valuation that is not detailed elsewhere in the report

10.2.4 Where applicable, the report should also detail recommendations or comments, if any, to improve the reliability of future valuations of insurance policy liabilities arising from the valuation, and the insurer’s responses to those comments and recommendations, if any, and any follow-up actions taken.

10.2.5 Where the principal requires the actuary to use specific assumptions or the actuary is relying upon an interpretation of legislation, accounting standards or other rulings supplied by the principal or its advisers, the actuary must clearly state the circumstances, discuss whether or not the assumptions are reasonable and consistent with this standard, and discuss the implications of divergence from this standard.

11 SUPPORTING APPENDICES

11.1 Summary of Information

11.1.1 The actuary should prepare a detailed summary of all the data and other information used to arrive at the valuation results. This could include information on:

a) Accounting (e.g. financial statements) and other internal financial information/reports
b) Reinsurance arrangements
c) Underwriting and claims management
d) Other recoveries (e.g. subrogation)
e) Summary of claims data provided
f) Sources used to set financial assumptions (e.g. discount and inflation rates)

11.1.2 Information sought will include both quantitative (e.g. electronic claims data and financial statements) and qualitative information (e.g. information gleaned from discussions with management, finance department, underwriting or claims management).

11.2 Summary of Data

11.2.1 The actuary should include a summary of the data used in the valuation of liabilities. This would typically include data on historical claims (e.g. claim payments, case estimates) and premiums.

11.2.2 Data should be presented where possible and practical, in the form of standard "run-off" triangles or other bases which reflect the valuation methods used. Data for the different groupings of risks or business lines used in the valuation should be shown separately.

11.3 "Clean vs. Un-Clean" Data

11.3.1 As part of the valuation, the actuary will analyse the raw data to identify any major deficiencies or errors, as well as to identify any aspects that may require the data to be modified or adjusted (e.g. for the impact of large claims or catastrophes).

11.3.2 In such cases, a summary of the data after any modifications or "cleaning" should be included, together with a detailed description and explanation of any modifications made.

11.3.3 Data can be shown net or gross of reinsurance to reflect the approach taken in the valuation.

11.4 Workings of Valuation Method

11.4.1 The summary of the valuation results should be sufficiently transparent to allow another actuary to review the adopted methodology, assumptions and results. For the generally accepted triangulation methods, this would include providing a summary of each step of the valuation.

11.4.2 For example, where a chain ladder approach is applied to reported claims, the appendix should include for each group of risks or business lines:

a) triangle of reported claims
b) chain ladder factors and selected factors for projection
c) projection of ultimate incurred claims
d) projected loss ratios
e) assessment of outstanding claims liability allowing for inflation and discounting if appropriate